

### **REMARKS**

In the Official Action mailed 01 August 2008, the Examiner reviewed claims 2 and 4-15. The Examiner has rejected claims 2 and 4-15 for double patenting; and has rejected claims 2 and 4-15 under 35 U.S.C. §102(b).

No claims are amended. The specification is amended to include a statement disclosing the names of the parties to a Joint Research Agreement under which the present invention arose.

Each rejection is respectfully traversed below, and reconsideration is requested.

#### **Rejection of Claims 2 and 4-15 for Double Patenting**

The Examiner has rejected claims 2 and 4-15 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-54 of U.S. Patent No. 6,453,446. Upon indication of otherwise allowable claims, Applicant will submit a Terminal Disclaimer as appropriate.

#### **Rejection of Claims 2 and 4-15 under 35 U.S.C. §102(b)**

The Examiner has rejected claims 2 and 4-15 under 35 U.S.C. §102(b) as being anticipated by Tsay *et al.* (US 5,461,576). Reconsideration is requested.

Tsay *et al.* teaches the use of a single slack graph structure designed to handle all of the path timing constraints in an integrated circuit chip design. This improves the communication between a placer performing placement of cells, and consequently changing nets between cells, and a timing constraint generator performing slack distribution. Tsay *et al.* distinguishes between a path timing constraint and a net timing constraint, where the path consists of a "whole path, not individual nets" (Tsay *et al.*, column 1, lines 51-53). According to Tsay *et al.*, by providing better feedback about the effects on all of the paths in the circuit, caused by making a placement or change in placement of a cell, and consequent changes in nets between cells, the placement process can be performed more efficiently. See, Tsay *et al.*, column 2, lines 47-57 for example.

Tsay *et al.* does not discuss the determination of the size or area of cells. Rather, in the implementations described, the cells subject of placement are retrieved from a standard cell library 12. (Tsay *et al.*, column 3, lines 38-56; column 4, lines 22-31). The step of adjusting the size or area of a cell is not mentioned in the reference.

In the procedures described in Tsay *et al.*, a placement is performed, and then it is determined whether the timing constraints have been met. If the timing constraints have not been met, then a re-placement is executed. There is no step described in Tsay *et al.* that relates to determining a size or area of a cell. In the procedure described in Tsay *et al.*, it can be inferred that the size or area of the cell is determined from the cell library prior to placement, because the parameter of size or area of the cell is not mentioned.

Claim 2 includes the limitation "determining an initial size or area of the cells in response to the initial placement." Because claim 2 requires this step, Tsay *et al.* does not anticipate claim 2, and does not anticipate any of claims 4-15 which depend from claim 2.

In the Official Action, the Examiner reads this limitation on "at least see Fig. 3, 6; col. 12 lines 6-14; col. 5 lines 24-67; col. 6 lines 1-67" (Official Action, page 3). Each of the cited portions of Tsay *et al.* are reviewed in the following paragraphs.

Figure 3 of Tsay *et al.* is a block diagram showing a placement module on the left and a module for creating a slack graph on the right. It shows an "initial placement" at the output of the module 124 labeled "Mincut Placement." After the initial placement, the slack graph is updated, and the "Placement" module 128 is executed. The procedure shows an iteration loop which is executed until the placement is done. However, the limitation in claim 2 of "determining an initial size or area of the cells in response to the initial placement" does not appear in the figure, and does not appear in the text at column 7, lines 4-26 of Tsay *et al.* which describes Figure 3.

Figure 6 of Tsay *et al.* is a flow chart showing a feedback loop from a "Layout Program" module 214 to the slack graph module 216. Again, the size or area of the cell is not mentioned. The text describing Figure 6, at column 9, line 44 through column 12, line 5, does not mention the size or area of the cell. One place in which one might expect to see a discussion of the size or area of the cell is in the timing constraint optimizer 210. However, as can be seen at column 11, lines 26-40, the parameters that are adjusted do not include size or area of the cell. Rather, Tsay *et al.* discusses optimization of edge delays, node/edge slacks, drive strength, loading, and so on.

The passage at column 12, lines 6-14 includes the statement that "the same techniques can be applied to other applications for timing optimization, such as sizing, power optimization, timing-driven routing and timing-driven logic synthesis." A similar comment is made in Tsay *et*

*al.* at column 2, lines 43-46, where the term "concepts" is used instead of the term "techniques". These two passages refer to "sizing" as an application for timing optimization, and suggest that the general concepts or techniques described in Tsay *et al.* can be used in that application. Tsay *et al.* does not describe exactly what techniques or concepts described in Tsay *et al.* can be used in a sizing process, nor how to apply such techniques or concepts. Furthermore, Tsay *et al.* does not describe a process for determining an initial size or area of a cell. Accordingly, this passage does not support the position on anticipation stated in the Office Action.

The passage at column 5, lines 24-67 describes a CLF file that contains predefined timing functions, none of which describes the size or area of the cell. Also, the passage describes the process of placing cells "closer together that require faster signal speeds." Again, there is no mention of how the size or area of the cell impacts the timing. This passage also describes certain commands used in the system for monitoring timing in a user's design. Again, none of these commands relates to the size or area of cells being placed.

The passage at column 6, lines 1-67 describes functions of the slack graph generator, including the results of commands that report timing information, commands for highlighting specific paths in the design, and commands for reporting interconnect parasitic capacitance and resistance. Again, there is no mention of the size or area of the cells in this passage.

The passages cited in the Office Action therefore do not support a finding of anticipation. As mentioned above, Tsay *et al.* does not describe a process as recited in claim 2, and does not describe any other process that involves determining a size or area of cells in a design. We focus for the purposes of this argument on the step of "determining an initial size or area of the cells in response to the initial placement." Because this limitation is not found in the reference, the position on anticipation is based on an error in fact about the teaching of Tsay *et al.*

The Office Action does not provide guidance concerning its interpretation of Tsay *et al.* as it relates to the question of determining an initial size or area of the cells. As mentioned above, the only passages in Tsay *et al.* that mention "sizing" are vague and do not describe the steps recited in the claims.

Because Tsay *et al.* does not literally recite the step of determining an initial size or area of the cells, in order to rely on this reference to "sizing" and the other cited passages to establish anticipation, the Examiner could be taking the unstated position that the claim limitations, including "determining an initial size or area of the cells in response to the initial placement," are

inherent in applying the “techniques” and “concepts” of Tsay *et al.* to a “sizing” application. If this is the case, it is clearly not supportable. In order for a claim limitation to be considered inherent in a prior art document, the law requires a very strict finding that “...that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.” *Continental Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991); as cited in MPEP §2131.01, III. There is no such finding on this record, and Applicant submits that no such finding would be reasonable. For example, the determination of an initial size of a cell according to Tsay *et al.*, is clearly based on contents of the cell library and not responsive to an initial placement. Therefore, the claim limitation of “determining an initial size or area of the cells in response to the initial placement,” is plainly not part of the teaching of Tsay *et al.*

Claims 4-15 depend from claim 2 and are not anticipated for at least the same reasons, and because of the unique combinations recited.

For example, with respect to claim 4, the Examiner states that Tsay *et al.* teaches “adjusting the initial delay values of the cells as necessary to meet predetermined timing constraints (at least see Fig. 2, 4, 6; summary)”. Actually, the Examiner relies on the same citation (at least see Fig. 2, 3, 6; summary) to support the rejection of all of the dependent claims. Applicant believes that the Examiner is mistaken. With respect to claim 4, Tsay *et al.* does not teach adjusting the delay values of cells. Rather, Tsay *et al.* teaches a tool that makes it easier to monitor slack during a procedure that relies on changing placement in order to meet timing constraints. Therefore, claim 4 recites an additional limitation not found in Tsay *et al.*

Claim 5 refers to claim 4, and recites the further step of “determining a size or area of the cells that will approximately maintain the adjusted delay values”. The Office Action reads this limitation on “(at least see Fig. 2, 4, 6; summary)”. As explained above, none of these passages in the reference relates to determining a size or area of the cell in any way. The position on anticipation stated by the Examiner is therefore clearly mistaken.

With respect to claims 6 and 7, which relate to sizing of cells, the Examiner relies on the same portions of Tsay *et al.*: “(at least see Fig. 2, 3, 6; summary)”. This is clearly mistaken because the cited portions of the reference do not relate in any way to adjusting the size or area of cells. Indeed, Tsay *et al.* does not describe any process for sizing cells as reviewed in detail above.

As to claims 8, 9 and 10 which relate to determining initial delay values using gain or logical effort, the Examiner is again, clearly mistaken. There is no discussion in Tsay *et al.* of these concepts for determining delay values of cells. Rather, these values are apparently provided by the cell library in the process of Tsay *et al.* The manner in which the delay values for cells in the library are determined is not described in Tsay *et al.*

Claim 11 refers to a continuous buffering assumption for determining gain of cells. The Examiner makes the same citation as applied to all the dependent claims to support the position on anticipation. In addition, the Examiner states "Note that using a buffering assumption is known to practitioners and it is inherently within the art in order to improve delay to meet all path timing constraints in an integrated circuit design." For the purposes of an anticipation rejection, this notation by the Examiner should be a reliance on the doctrine of inherency. However, if it is a reliance on the doctrine of inherency, it is clearly inadequate.

As described above, to rely on inherency the Examiner must find that the claimed step "wherein the preferred gain of the cells is determined using a continuous buffering assumption" is necessarily present in Tsay *et al.*, and that such would be known to persons of skill. Applicant submits that continuous buffering is not inherent in Tsay *et al.*, and indeed does not appear to be relevant to the teaching of Tsay *et al.*

With respect to claims 12-14, Applicant suggests that the portions of Tsay *et al.* cited by the Examiner are not relevant.

With respect to claim 15, again, the Examiner is clearly mistaken. There is no discussion in Tsay *et al.* concerning the size or area of cells, and no discussion as required in claim 15 of cells having variable size or area which is not fixed at the time the cells are selected.

Accordingly, reconsideration of the rejection of claims 1 and 4-15 is respectfully requested.

#### Correction of Inventorship

The Examiner's attention is drawn to the accompanying petition to correct inventorship by adding Dr. Kudva as co-inventor. Dr. Kudva's interest in the present application is held by IBM Corporation.

Accompanying Disclosure Concerning Related Litigation

The Examiner's attention is drawn to the accompanying Disclosure Concerning Related Litigation which provides background material for the change in inventorship submitted herewith.

Accompanying Information Disclosure Statement

The Examiner's attention is drawn to the accompanying Information Disclosure Statement, including a Declaration by Gary Ditlow and Joachim Clabes relating to a "Stay Tuned Program" used internally by IBM Corporation as early as 1995.

The Examiner's attention is also drawn to co-pending Reexam Control No. 90/008,184 regarding U.S. Patent No. 6,725,538 and co-pending Reexam Control No. 90/008,182 regarding U.S. Patent No. 6,453,446, which are parents of the present continuation application, and whose Image File Wrappers are included in the accompanying Information Disclosure Statement.

Joint Research Agreement

Applicant amends the specification as noted above to state that the invention subject of the present application was made as a result of activities undertaken within the scope of a joint research agreement between IBM Corporation and Synopsys, Inc., in order to obtain the benefits of 35 U.S.C. §103(c).

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**CONCLUSION**

It is respectfully submitted that this application is now in condition for allowance, and such action is requested.

The Commissioner is hereby authorized to charge any fee determined to be due in connection with this communication, or credit any overpayment, to our Deposit Account No. 50-0869 (SYNP 1006-0).

Respectfully submitted,

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/ Mark. A. Haynes /

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